

WHAT IS CLAIMED IS:

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1. A method for alerting the pilot of an aircraft to a potentially hazardous condition comprising the steps of:

- estimating a deceleration required to stop the aircraft on a runway of intended landing;
- comparing said deceleration to a maximum deceleration of the aircraft; and
- asserting an alert signal when said deceleration is greater than said maximum deceleration.

2. The method of claim 1 wherein said step of estimating deceleration further includes the step of including a gain factor in said deceleration to account for at least one of a plurality of runway surface conditions.

3. The method of claim 1 wherein said step of estimating deceleration further includes the step of including a gain factor in said deceleration to account for at least one atmospheric condition.

526
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4. The method of claim 1 wherein said step of asserting an alert signal includes the step of commanding an autopilot go-around manoeuvre.

5. A method for alerting the pilot of an aircraft to a potential go-around condition comprising the steps of:

- monitoring a plurality of parameters indicative of an unstabilized approach;
- assigning a risk of go-around value according to each of said parameters; and
- asserting an alert signal when said value exceeds a predetermined threshold amount.

6. The method of claim 5 wherein said step of monitoring a plurality of parameters includes the step of monitoring a change in a speed of the aircraft.

7. The method of claim 5 wherein said step of monitoring a plurality of parameters includes the step of monitoring a runway wind condition.

1 8. The method of claim 5 wherein said step of monitoring a plurality of
2 parameters includes the step of monitoring a flight path angle of the aircraft.

1 ^{Sub}_{A1} 9. The method of claim 5 wherein said step of monitoring a plurality of
2 parameters includes the step of monitoring a position of the aircraft.

1 10. The method of claim 5 wherein said step of monitoring a plurality of
2 parameters includes the step of monitoring a track of the aircraft.

1 ^{Sub}_{A1} 11. The method of claim 5 wherein said step of asserting an alert signal
2 comprises the step of commanding an autopilot go-around manoeuvre.

1 12. The method of claim 5 wherein said step of asserting an alert signal
2 further comprises the steps of:

3 asserting a go-around caution alert signal when said value exceeds a first
4 threshold amount and is less than a second threshold amount; and

5 asserting a go-around warning signal when said value exceeds said second
6 threshold amount.

1 13. A method of alerting the pilot of an aircraft to a potential go-around
2 condition comprising the steps of:

3 monitoring a plurality of parameters indicative of a runway landing length
4 required;

5 assigning a risk of runway overrun value based on said plurality of parameters;

6 and

7 asserting an alert signal when said risk value exceeds a predetermined
8 threshold value.

1 14. The method of claim 13 wherein said step of monitoring a plurality of
2 parameters includes the step of monitoring a deceleration required to stop the aircraft.

1 15. The method of claim 13 wherein said step of monitoring a plurality of
2 parameters includes the step of monitoring a runway surface condition.

1 16. The method of claim 13 wherein said step of monitoring a plurality of
2 parameters includes the step of monitoring at least one atmospheric condition.

1 520 17. The method of claim 13 wherein said step of asserting an alert signal
2 further comprises the steps of:

3 asserting a go-around caution alert signal when said value exceeds a first
4 threshold amount and is less than a second threshold amount; and

5 asserting a go-around warning signal when said value exceeds said second
6 threshold amount.

1 18. The method of claim 13 wherein said step of asserting an alert signal
2 comprises the step of commanding an autopilot go-around manoeuvre.

1 19. A computer program product for alerting the pilot of an aircraft to a
2 potentially hazardous condition comprising:

3 a computer readable storage medium having computer readable program code
4 means embodied in said medium, said computer readable program code means having:

5 a first computer instruction means for estimating a deceleration required to
6 stop the aircraft on a runway of intended landing;

7 a second computer instruction means for comparing said deceleration to a
8 maximum deceleration of the aircraft; and

9 a third computer instruction means for asserting an alert signal when said
10 deceleration is greater than said maximum deceleration.

1 20. The computer program product of claim 19 further including a fourth
2 instruction means for asserting an autopilot go-around command when said alert signal is
3 asserted.

1 21. A computer program product for alerting the pilot of an aircraft to a
2 potential go-around condition comprising:

3 a computer readable storage medium having computer readable program code
4 means embodied in said medium, said computer readable program code means having:

5 a first computer instruction means for accessing and monitoring a plurality of
6 parameters indicative of an unstabilized approach;

7 a second computer instruction means for assigning a risk of go-around value
8 according to each of said parameters; and

9 a third computer instruction means for asserting an alert signal when said
10 value exceeds a predetermined threshold amount.

1 22. The computer program product of claim 21 further comprising a fourth
2 instruction means for asserting an autopilot go-around command when said alert signal is
3 asserted.

1 23. A computer program product for alerting the pilot of an aircraft to a
2 potential go around condition comprising:

3 a computer readable storage medium having computer readable program code
4 means embodied in said medium, said computer readable program code means having:

5 a first computer instruction means for accessing and monitoring a plurality of
6 parameters indicative of a runway landing length required;

7 a second computer instruction means for assigning a risk of runway overrun
8 value based on said plurality of parameters; and

9 a third computer instruction means for asserting an alert signal when said risk
10 value exceeds a predetermined threshold value.

1 24. The computer program product of claim 23 further including a fourth
2 computer instruction means for asserting an autopilot go-around command when said alert
3 signal is asserted.

1 25. An apparatus for alerting the pilot of an aircraft to a potential go-
2 around condition comprising:

3 an input coupled to receive a plurality of parameters useful as indicators of an
4 unstabilized approach;

5 an output; and

6 a signal processing device, coupled to said input, and to said output for:
7 assigning a risk of go-around value according to each of said parameters; and
8 asserting an alert signal when said value exceeds a predetermined threshold
9 amount.

1 26. The apparatus of claim 25 wherein said apparatus comprises an
2 Enhanced Ground Proximity Warning computer.

1 27. The apparatus of claim 25 wherein said alert signal further includes
2 signals useful for driving a display.

1 28. The apparatus of claim 25 wherein said alert signal further includes an
2 aural alert signal.

1 29. The apparatus of claim 25 wherein said parameters include a change in
2 a speed of the aircraft.

1 30. The apparatus of claim 25 wherein said parameters include a runway
2 wind condition.

1 31. The apparatus of claim 25 wherein said parameters include a flight
2 path angle of the aircraft.

1 ^{SUB} 32. The apparatus of claim 25 wherein said parameters include a position
2 of the aircraft.

1 33. The apparatus of claim 25 wherein said parameters include a track of
2 the aircraft.

1 ^{SUB} 34. The apparatus of claim 25 wherein said alert signal comprises an
2 autopilot go-around manoeuvre command.

1 43. The apparatus of claim 38 wherein said alert signal further includes
2 signals useful for driving a display.

1 44. The apparatus of claim 38 wherein said alert signal further includes an
2 aural alert signal.

1 45. The apparatus of claim 38 wherein said alert signal comprises an
2 autopilot go-around manoeuvre command.

1 46. The apparatus of claim 38 further including a database of runway data.

1 47. The apparatus of claim 38 wherein said parameters include runway
2 data.

1 48. The apparatus of claim 38 wherein said parameters include terrain
2 data.

1 49. An apparatus for alerting the pilot of an aircraft to a potentially
2 hazardous condition comprising:
3 an input coupled to receive runway data and at least one aircraft performance
4 data;
5 an output; and
6 a signal processing device coupled to said input and to said output for:
7 estimating a deceleration required to stop the aircraft on a runway of
8 intended landing;
9 comparing said deceleration to a maximum deceleration of the aircraft;
10 and
11 asserting an alert signal when said deceleration is greater than said
12 maximum deceleration.

1 50. The apparatus of claim 49 wherein said runway data includes at least
2 one runway surface condition.

1 51. The apparatus of claim 49 wherein said input is further coupled to
2 receive at least one atmospheric condition.

1 52. The apparatus of claim 49 wherein said input is further coupled to
2 receive a runway end point data.

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a1 53. The apparatus of claim 49 wherein said alert signal includes an
2 autopilot go-around manoeuvre command.

1 54. The apparatus of claim 49 wherein said alert signal further includes
2 signals useful for driving a display.

1 55. The apparatus of claim 49 wherein said alert signal further includes an
2 aural alert signal.

1 56. The apparatus of claim 49 further including a database of runway data.

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a1 57. The apparatus of claim 49 wherein said apparatus comprises an
2 Enhanced Ground Proximity Warning computer.

1 58. The apparatus of claim 56 wherein said database further includes
2 terrain data.

1 59. The apparatus of claim 46 wherein said database further includes
2 terrain data.